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10/047,289	01/14/2002	Debargha Mukherjee	10017336 -1	5155

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EXAMINER	
HUNG, YUBIN	
ART UNIT	**PAPER NUMBER**
2625	

DATE MAILED: 11/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/047,289	MUKHERJEE, DEBARGHA	
	Examiner	Art Unit	
	Yubin Hung	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-12 and 17-24* is/are rejected.

7)☒ Claim(s) *4 and 13-16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01/24/2002* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/29/03, 4/6/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because Fig. 6 does not accurately describe its corresponding embodiment. Specifically, regarding refs. 620-662, since NCOL is always reset to 0 at refs. 620 and 640, NCOL = N_F (ref. 642) can only be true when N_F is either 0 or 1, which is clearly not intended (per P. 9, lines 1-4).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities:

- P. 3 is missing

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 6, 10-12 and 22-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 6 recites the limitation "the causal irrelevant pixels" in line 6. There is insufficient antecedent basis for this limitation in the claim.

6. Claim 10 recites the limitation "m_1" in line 1 and "m_2" in line 2". The two terms are not defined and therefore render the claim indefinite and ambiguous. Claims 11 and 12 inherit the same problem. Claims 22-24 are similarly analyzed and rejected.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1, 5, 6, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Queiroz ("On Data Filling Algorithms for MRC Layers," Proc. 2000 Int'l Conf. Image Processing, V. 2, 10-13 Sept. 2000, pp. 586-589).

10. Regarding claim 1, and similarly claim 17, Queiroz discloses

a) decomposing the image into a plurality of stripes
[P. 588, Sect. 4, lines 1-4. Note that while 8x8 blocks are used here, it would have been obvious to one of ordinary skill in the art to have a block with a width the same as that of the image, i.e., using stripes, since it is well known in the art that the main mask layer must always span the entire width]

b) decomposing each stripe into foreground and background image layers, and a mask layer
[P. 586: Fig. 2; Sect. 2, lines 1-4. P. 588, Sect. 4, lines 4-8. Note that it is clear that the input image is segmented into an initial foreground, background and mask layers before the iterative block smoothing is carried out]

c) applying a smoothing filter to interpolate irrelevant pixel values in the foreground and background layers for wavelet encoding efficiency

[P. 586: Fig. 2; Sect. 2 (redundant data are considered "irrelevant"). P. 588, Sects. 4 & 4.1. Note that Sect. 4.1 describes an interpolation operation. Note further that the improvement in wavelet coding efficiency after smoothing is inherent]

11. Regarding claim 5 Queiroz discloses all limitations of its parent, claim 1. In addition, Queiroz further discloses

i) classifying each pixel within a selected layer as relevant or irrelevant
[Fig. 3; P. 586: Sect. 2, lines 10-11. Note that the redundant pixels are the irrelevant pixels]

and teaches/suggests

ii) applying a smoothing filter to each irrelevant pixel, p_c, proceeding in a raster scan order to interpolate a value for that irrelevant pixel
[P. 588: Sect. 4.1. Note that the raster scan order would have been an obvious choice to one of ordinary skill in the art]

12. Regarding claim 6, and similarly claim 18, Queiroz further discloses

- a normalized weighted average of the relevant pixels and the causal irrelevant pixels contribute to the interpolated value
[P. 588: Sect. 4.1. Note that after each pass a just-processed redundant (i.e., irrelevant) pixel is designated as a relevant pixel (i.e., becoming a "causal irrelevant pixel") for the purpose of interpolation]

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13. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Queiroz ("On Data Filling Algorithms for MRC Layers," Proc. 2000 Int'l Conf. Image Processing, V. 2, 10-13 Sept. 2000, pp. 586-589) as applied to claims 1, 5, 6, 17 and 18 above, and further in view of Zeng (US 6,236,757).

Regarding claim 2 Queiroz discloses all limitations of its parent, claim 1.

Queiroz does not expressly disclose

d) encoding the foreground, background, and mask layers with a forward discrete wavelet transformation encoder

However, Zeng teaches/suggests the use of a forward discrete wavelet transform to code different segments of an image. [Fig. 1; Col. 3, lines 18-26.]

Queiroz and Zeng combinable because they have aspects that are from the same endeavor of image compression..

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Queiroz with the teachings of Zeng by coding the foreground, the background and the mask with a forward discrete wavelet transform encoder. The motivation for doing so would have been because the best wavelet coder can be selected for each layer to produce efficient coding results. [See Zeng: Col. 1, line 66 – Col. 2, line 5.]

Therefore, it would have been obvious to combine Zeng with Queiroz to obtain the invention of claim 2.

***

14. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Queiroz ("On Data Filling Algorithms for MRC Layers," Proc. 2000 Int'l Conf. Image Processing,

V. 2, 10-13 Sept. 2000, pp. 586-589) and Zeng (US 6,236,757) as applied to claim 2 above, and further in view of the MRC standard (ITU-T T.44 04/99).

Regarding claim 3, the combined invention of Queiroz and Zeng discloses all limitations of its parent, claim 2.

Queiroz does not expressly disclose

- the foreground and background are JPEG 2000 encoded, wherein the mask is encoded with one of a JBIG and a JBIG2 encoder

However, the MRC standard suggests the use of any ITU-T multi-level coding (such as JPEG2000) for the foreground and the background, and any ITU-T bi-level coding (such as JBIG or JBIG2) for the mask. [P. V, 2nd paragraph from bottom, lines 1-4.]

The combined invention of Queiroz and Zeng is combinable with the MRC standard because they have aspect that is from the same endeavor of processing the mixed raster content planes.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Queiroz and Zeng with the teachings of the MRC standard by coding the foreground and the background with JPEG2000 and the mask with either JBIG or JBIG2. The motivation for doing so would have been they are well known to produce efficient coding results.

Therefore, it would have been obvious to combine the MRC standard with Queiroz and Zeng to obtain the invention of claim 3.

***

15. Claims 7-12 and 19-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Queiroz ("On Data Filling Algorithms for MRC Layers," Proc. 2000 Int'l Conf. Image Processing, V. 2, 10-13 Sept. 2000, pp. 586-589) as applied to claims 1, 5, 6, 17 and 18 above, and further in view of Izquierdo et al. ("Texture Smoothing and Object Segmentation Using Feature-Adaptive Weighted Gaussian Filtering," Proc. 1998 Int'l Telecommunications Symposium, V. 2, 9-113 Aug. 1998, pp. 650-655).

16. Regarding claim 7, and similarly claim 19, Queiroz discloses all limitations of its parent, claim 5.

Queiroz does not expressly disclose that the smoothing filter is a weighted Gaussian filter.

However, Izquierdo teaches/discloses using a weighted Gaussian filter for smoothing. [P. 650, right column, 2nd paragraph, lines 1-2.]

Queiroz and Izquierdo are combinable because they both have aspects that are from the same fields of endeavor of mage smoothing and segmentation.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Queiroz with the teachings of Izquierdo by using a weighted Gaussian filter to smooth areas of interest in an image. The motivation for doing so would have been it allows the filter to adapt to the roles of the pixels in the mask and therefore achieves better results.

Therefore, it would have been obvious to combine Izquierdo with Queiroz to obtain the invention of claim 7.

17. Regarding claim 8, and similarly claim 20, Queiroz further discloses

- each element of the smoothing filter is of the form $w_{kl}V_{kl}$, wherein V_{kl} is a non-weighted filter value, wherein w_{kl} is a function of its associated pixel causality and relevance
  [P. 588: Sect. 4.1. Note that here (using a 4-neighbor) the weight (w_{kl}) for an irrelevant (i.e., redundant) pixel (including the center pixel) is zero and the weight for a causal or relevant pixel is 1/k where k is the number of causal or relevant pixels in the mask]

18. Regarding claim 9, and similarly claim 21, Queiroz further discloses

- $w_{kl} = 0$ for the center pixel (p_c) and any non-causal irrelevant pixel
  [Per the analysis of claim 8]

19. Regarding claim 10, and similarly claim 22, Queiroz further discloses

- $w_{kl} = m_1$ if its associated pixel is a relevant pixel, wherein $w_{kl} = m_2$ if the associated pixel is a causal irrelevant pixel

[Per the analysis of claim 8 with $m_1 = 0$ if its associated pixel is a relevant pixel and $m_2 = 1/k$ (k= the number of causal or relevant pixels in the mask) if the associated pixel is a causal irrelevant pixel]

20. Regarding claims 11, 12, 23 and 24, Queiroz discloses substantially the claimed invention as set forth in the discussion above for claim 10.

Queiroz does not disclose expressly either $m_1/m_2 > 1$ (claims 11 & 23) or $m_1/m_2 = 2$ (claims 12 & 24).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to set $m_1/m_2 > 1$ or $m_1/m_2 = 2$. Applicant has not disclosed that setting $m_1/m_2 > 1$ or $m_1/m_2 = 2$ provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with either setting $m_1/m_2 = 0$ as taught by Queiroz or setting m_1/m_2 to a value greater than 1 or equal 2 because any of the setting will provides adequate weighting to smooth the image area.

Therefore, it would have been obvious to of ordinary skill in this art to modify Queiroz by setting m_1/m_2 to a value greater than 1 or equal 2 to obtain the inventions as specified in claims 1 and 12, respectively.

Allowable Subject Matter

21. Claims 4 and 13-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

22. The following is a statement of reasons for the indication of allowable subject matter: .

23. Regarding claim 4, prior art of record fails to teach or suggest all limitations. Specifically, while ITU-T T.44 (04/99) teaches/suggests determining base color and offset for background layer and foreground layer [PP. 9-10: Sect. 9.3], the offset is not to a common reduced area of each layer. In addition, while Queiroz identifies a common area (the "redundant" area) and further modifies a border zone (T_x) of that area [P. 587: Figs. 3 & 4; Sect. 3, lines 1-12], it does not separate the common area into foreground and background layers.

24. Regarding claims 13 and 15, prior art of record fails to teach or suggest all limitations. Specifically, while Bottou et al. (US 5,900,953) teaches/suggests

- (both claims 13 and 15) dividing a selected layer into a plurality of decision regions (D_{ij}) and associated analysis regions (A_{jj}), wherein each $D_{ij} \sqsubseteq A_{ij}$
  [Figs. 5-7; Col. 4, line 55 - Col. 5, line 40]

and Matthews (Pub. No.: US 2003/0048954) teaches/suggests

- (claim 13) assigning the entire region D_{ij} to one of the background and foreground layers, if a *feature value of* D_{ij} does not exceed a pre-determined threshold
  [Fig. 2: refs. 50, 58, 60; Paragraph 32 (PP. 2-3)]
- (claim 15) distributing the pixels of D_{ij} between the background and 6 foreground layers, if a *feature value of* D_{ij} exceeds a pre-determined threshold
  [Fig. 2: refs. 44-48, 52-60; P. 2, Paragraph 31]

Neither teaches or suggests that the assignment of pixels of D_{ij} is based on **the contrast of A_{ij}** (instead of the gradient of D_{ij}, as taught by Matthews).

Contact Information

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (703) 305-1896. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Yubin Hung
Patent Examiner
November 22, 2004

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